



RSM+WRF Multimodel Ensemble Experiment for Seasonal Forecast in the Andean Countries

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RSM WS 2010, Sapporo, August 10th 2010



Outline

+ Introduction

- The Andean Observatory.
- Why? What? Who? Goals and objectives
- Dynamical Downscaling

+ RSM WRF Ensemble Experiment

+ Next steps



Observatorio Andino

Why?

- * Andes population: 120 million people
- * Andes: + more than 7,000 km length,
+ typically 200 km wide,
+ 4,000 m average altitude



Observatorio Andino

Why?

- * Low station density
- * Low quality data records
- * About 30 years of data in best cases
- * Heterogeneous methodologies for data processing



Observatorio Andino

What?

A regional initiative that aims to provide different scientific tools that may help the decision makers to improve Risk Management and Early Warning Systems

OBSERVATORIO ANDINO



Who?





Observatorio Andino

Goals:

- + Monitor environmental variables
 - + Improve Forecast Tools
- + Homogenize methodologies
 - + Capacity building
- + Regional collaboration
 - + Useful information



Observatorio Andino

2010-2012 Objectives:

- + Improve Weather and Seasonal Forecast in the Andean Countries**
- + Standardize tools and methodologies:**
 - Forecast**
 - Validation/Verification**
 - Data processing**
- + Build capacity-Trainings**



Dynamical Downscaling and Seasonal Forecast



CAM_CMC (2 tier)

tier-1: P-SST,

CFS_SST, CA_SST

LEVEL I



Dynamical Downscaling

(CMM5, CWRf, RSM, RegCM, ETA)

LEVEL II



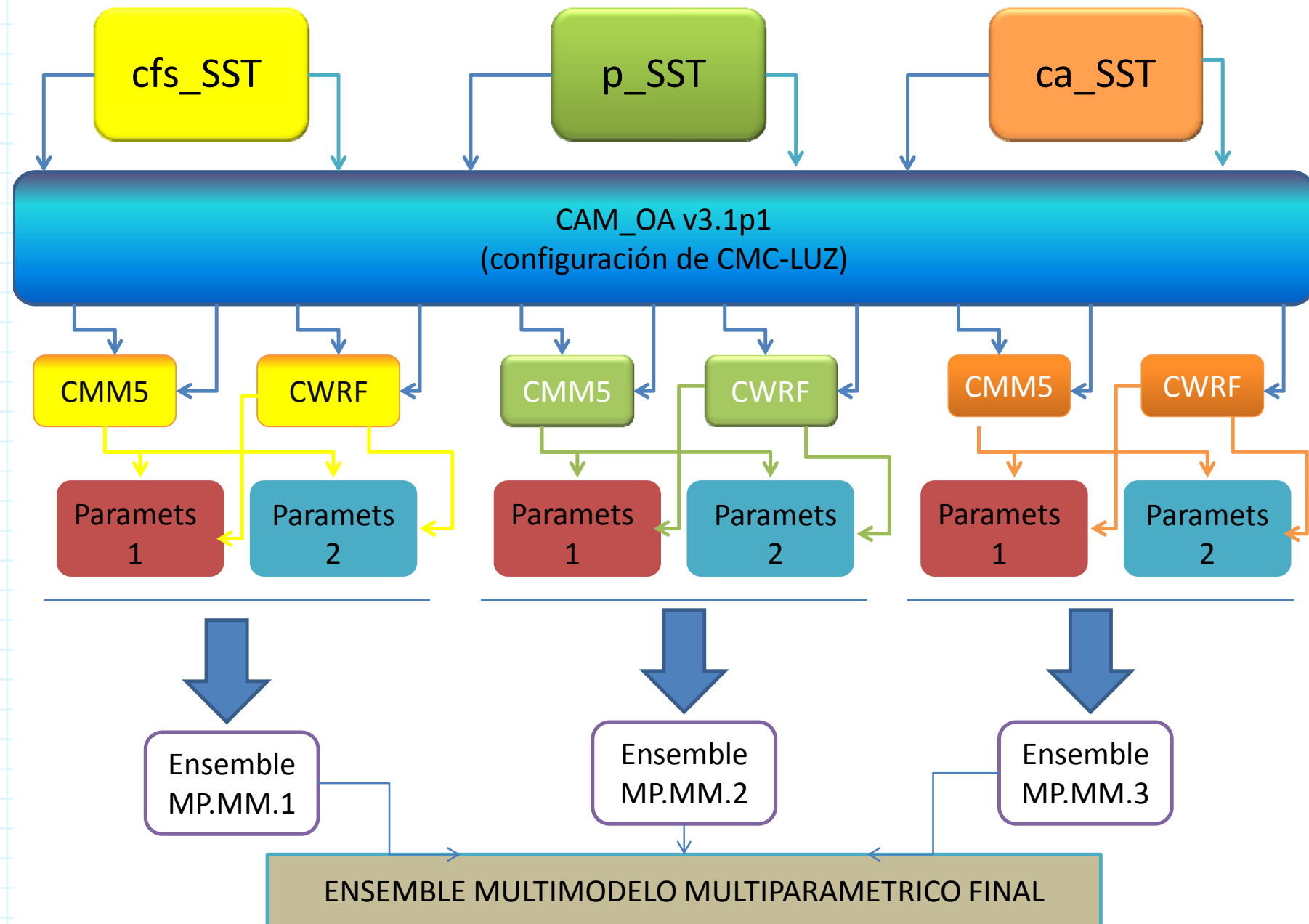
Hydrological Models

(VIC, NOAH, RUC, CLM)

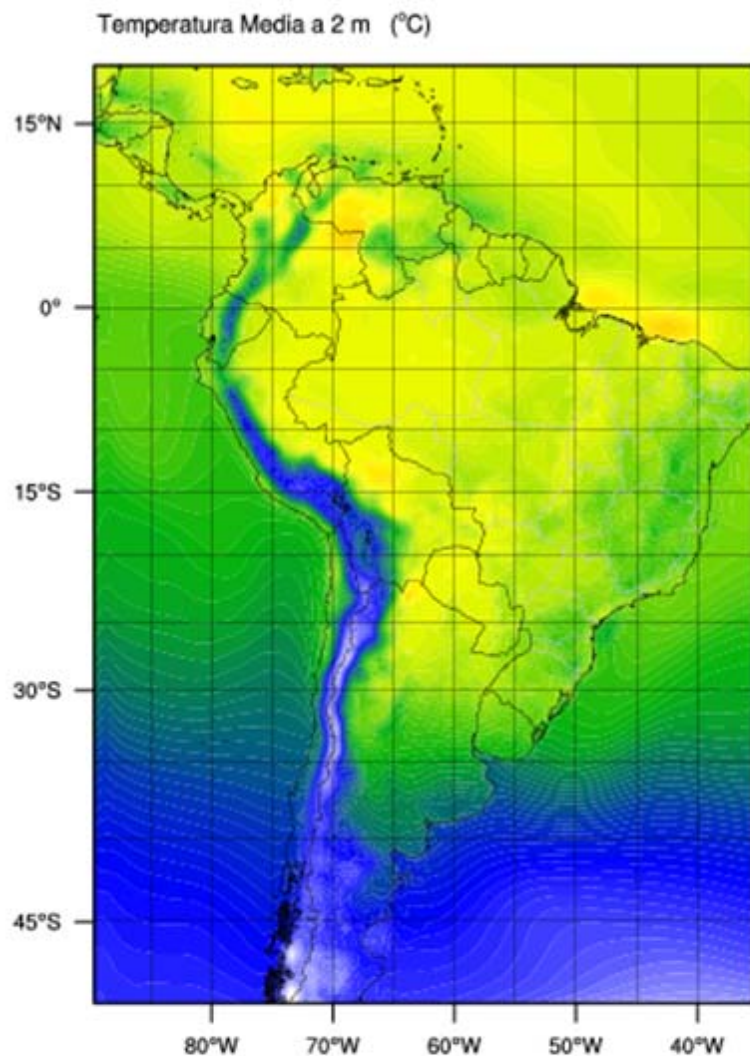
Ensemble Malaria

CAVEAT, CAVEL

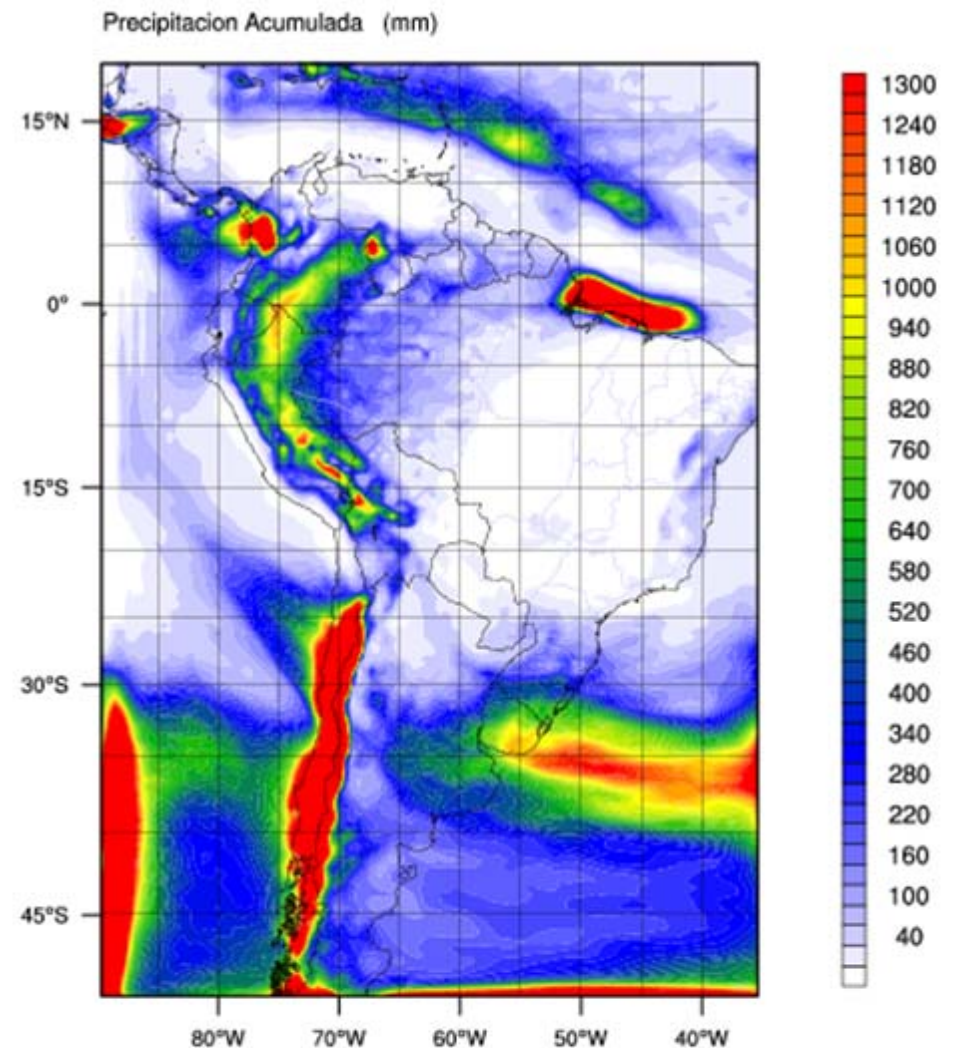
LEVEL III



CWRF-CAM_OA Ensemble ASO 2010

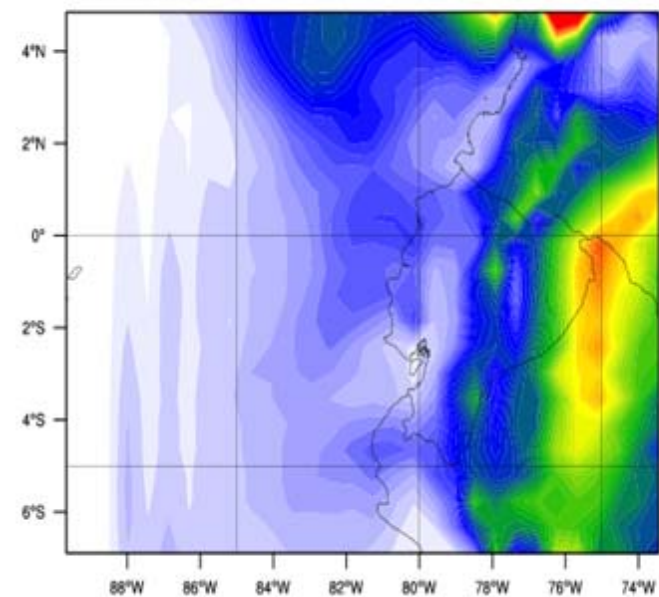


CWRF-CAM_OA Ensemble ASO 2010

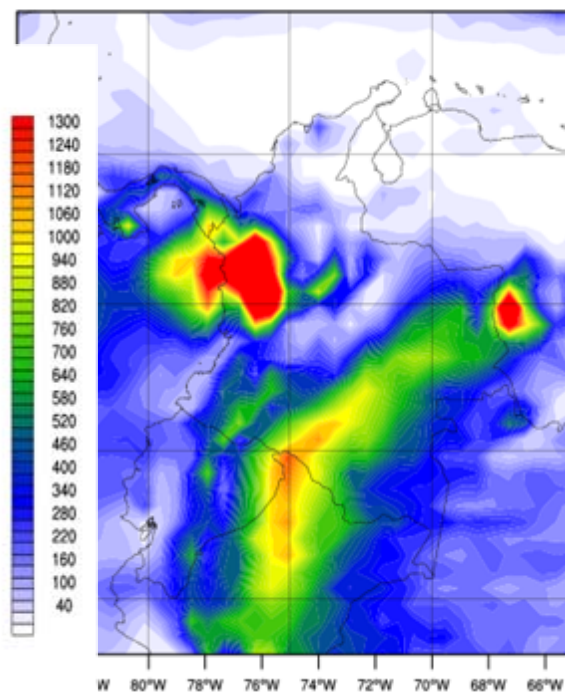




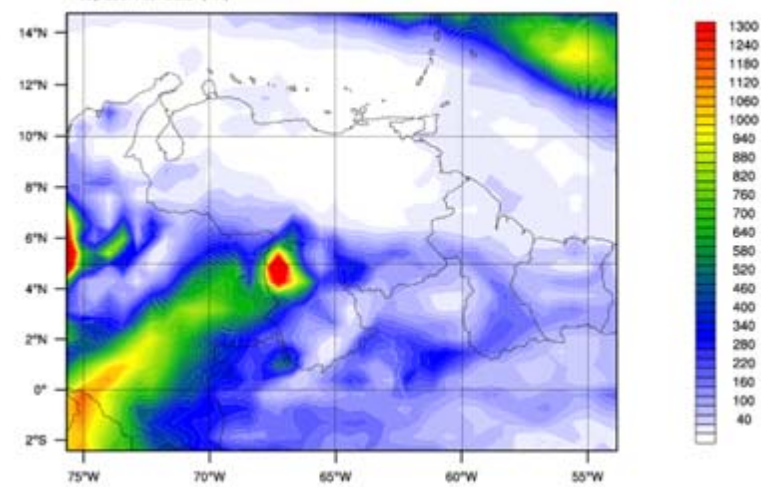
Precipitacion Acumulada (mm)



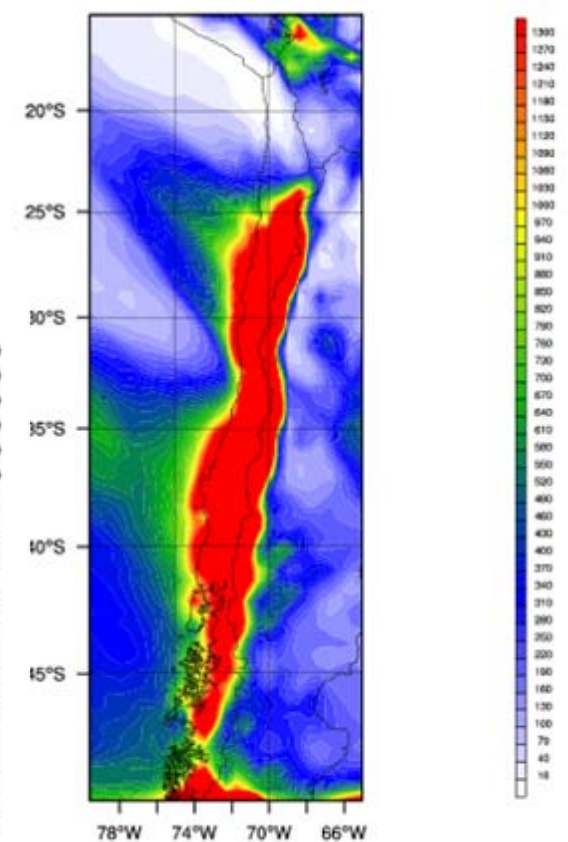
Precipitacion Acumulada (mm)



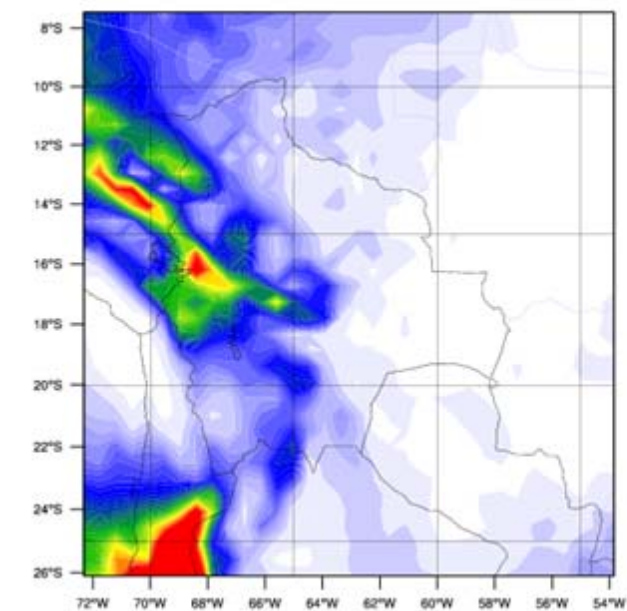
Precipitacion Acumulada (mm)



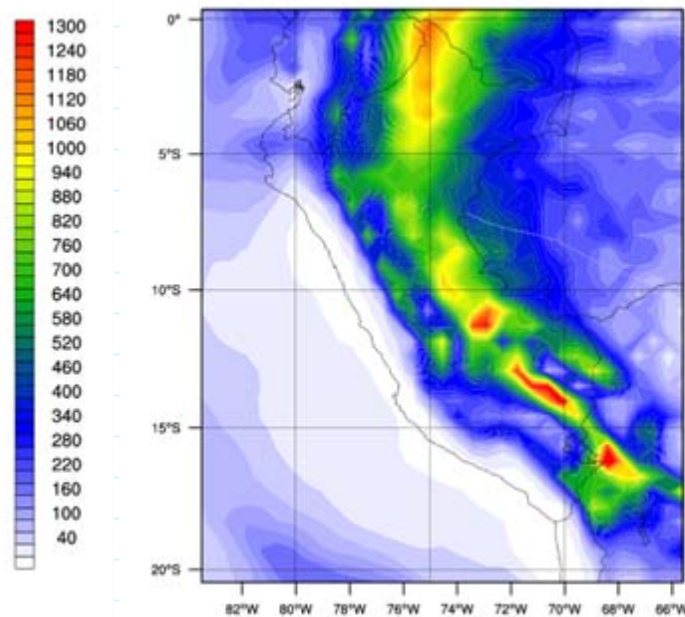
Precipitacion Acumulada (mm)



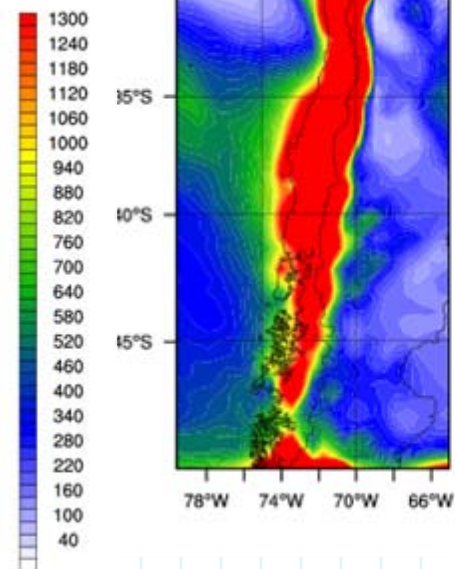
Precipitacion Acumulada (mm)



Precipitacion Acumulada (mm)



Precipitacion Acumulada (mm)





RSM + WRF Ensemble Experiment (Andes)

JJA
2009

NDJ
2009-2010

Monthly:
J,J,A,N,D,J



RSM + WRF Ensemble Experiment (Andes)

+ Driven by
R2

+ 60 km

+ 6 hr

+ 1 month spin-up

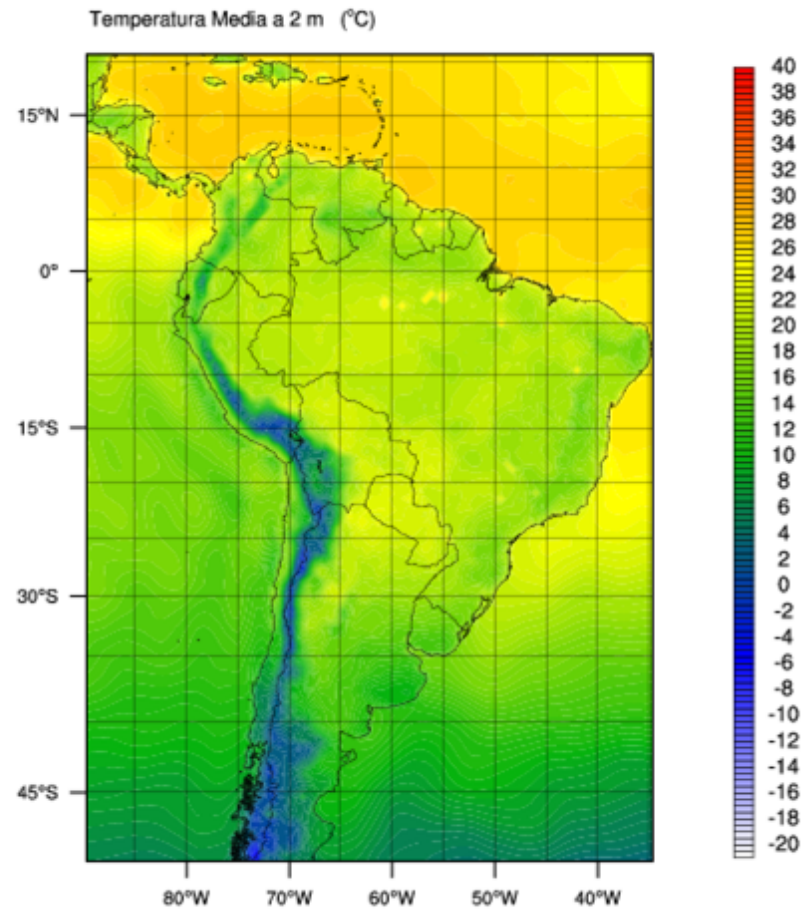
OBS:

+ NOAA-CPC daily 1 deg
(only precip)

+ CAMS (w Object. Anal.)

RSM + WRF Ensemble Experiment

Domain





Experiment Configuration

WRF 3.0

Microphysics	WSM 3
LW	CAM
SW	CAM
SFCLAY	MO(J)
SURFACE	NOAH
PBL	MJJ
CUMULUS	KF

RSM

Microphysics	WSM 3
LW	M-D Chou
SW	M-D Chou
SFCLAY	-
SURFACE	NOAH
PBL	MRF
CUMULUS	KF2 (WRF)



Experiment Configuration

WRF 3.0

Microphysics	WSM 3
LW	CAM
SW	CAM
SFCLAY	MO(J)
SURFACE	NOAH
PBL	YSU
CUMULUS	GD

RSM

Microphysics	WSM 3
LW	M-D Chou
SW	M-D Chou
SFCLAY	-
SURFACE	OSU
PBL	MRF
CUMULUS	KF2 (WRF)



Experiment Configuration

WRF 3.0

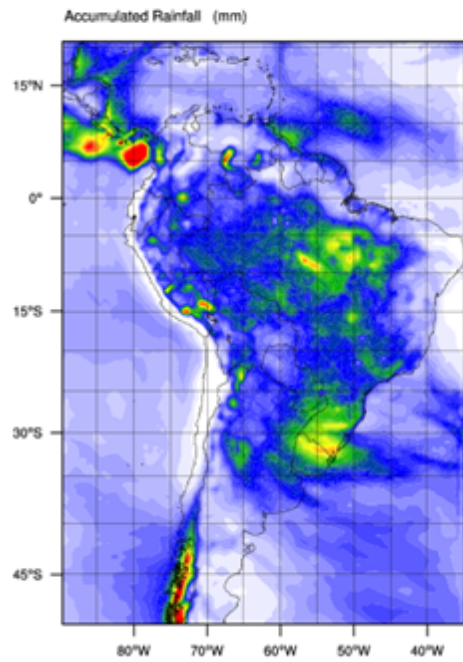
Microphysics	WSM 3
LW	CAM
SW	CAM
SFCLAY	MO(J)
SURFACE	NOAH
PBL	MJJ
CUMULUS	GD

RSM

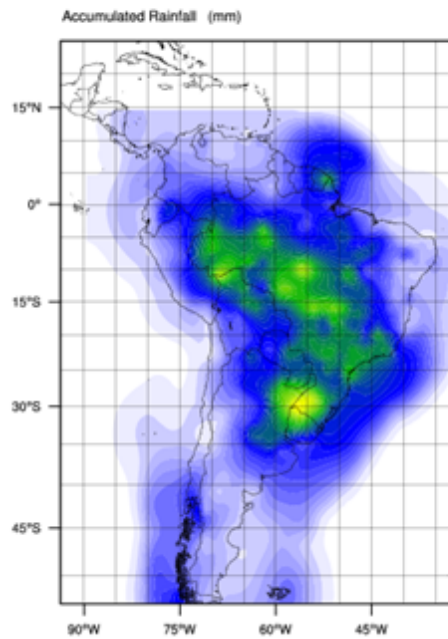
Microphysics	WSM 3
LW	M-D Chou
SW	M-D Chou
SFCLAY	-
SURFACE	OSU
PBL	MRF
CUMULUS	RAS

Preliminary results

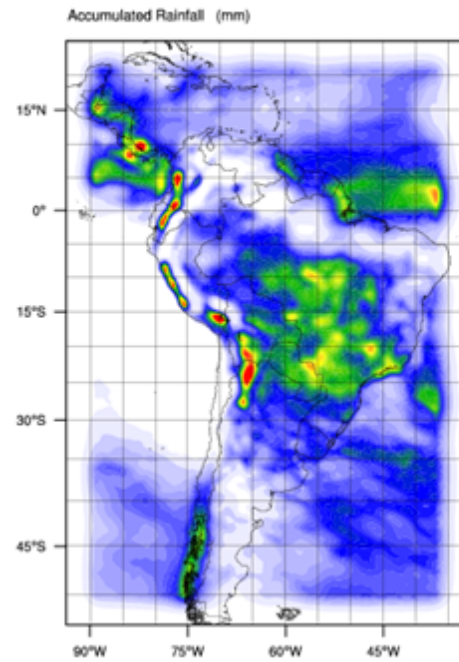
CWRF: NDE 2009-2010 60km



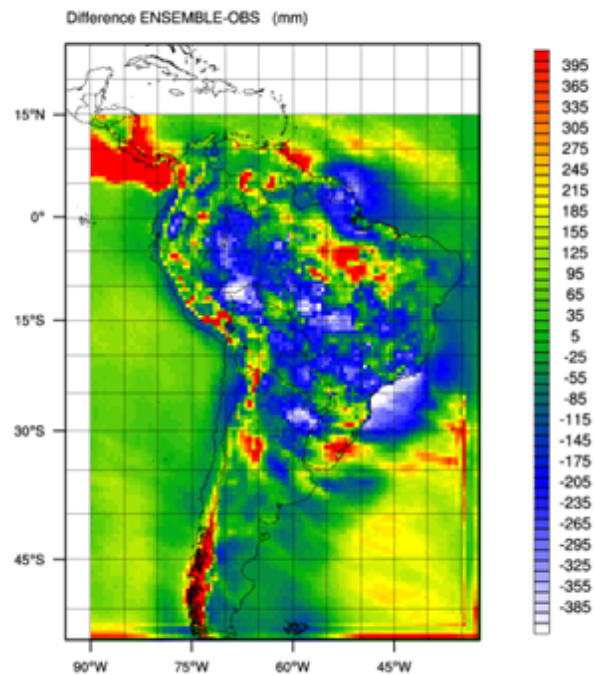
OBS: NDE 2009-2010 1deg



RSM: NDE 2009-2010 60km



ENSEMBLE - OBS



NDJ
2009-2010



NEXT STEPS

- + To complete the simulations
 - + Bias
 - + RMSE
- + Pattern correlations
- + Applications: **Drought** 2009-2010
- + Applications: **Climate and Health**



Summary

- + Need of “decision making tools” for the Andes
 - + The Andean Observatory
 - + Ensemble experiment: still in process
 - + WRF tends to underestimate near the Pacific Coast
- + RSM doesn't recognize the precipitation cluster in South Eastern SA, and tends to overestimate over the Andes



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